Don't forget the foal: The nursing requirements of hospitalised foals when the mare is the primary patient.

Abstract

In the post-partum period, there are a range of factors that could result in the hospitalisation of the mare. To minimise the long-term impact that the hospitalisation period has on the physical and behavioural development of the foal veterinary practices should have a protocol in place to care for a foal even though the mare is the primary patient.

When patients are admitted detailed information should be gathered from the owner about both the mare and the foal. This provides valuable information necessary to plan appropriate nursing care. Important factors that need to be considered when planning care include the nutritional needs of the foal, the development of the selective bond between the mare and the foal and the handling of them as patients.

Where possible the owner should be encouraged to participate in the care of their mare and the foal during the hospitalisation period. This will help the owner feel more involved in the provision of care and have a better understanding of the mare and foal's care requirements post discharge. This is a technique used in human paediatric nursing and is known as parent participation in care.

Key words:

Mare, foal, assisted feeding, suckle reflex, owner participation in care, foal nutrition.

Introduction

It is common for mares to show mild colic signs immediately post-partum due the contraction of the uterus. However, severe or persistent colic is an indicator that there may be a serious underlying issue. As discussed by Livesey, Carson and Stanton, (2008) intestinal disease including caecal rupture, large colon displacement and diaphragmatic hernia are likely causes of more severe post-partum colic. Other conditions that may result in post-partum hospitalisation of a mare include haemorrhage, retained foetal membranes and rectal prolapse for example (Frazer, 2002a; Frazer, 2002b).

Hospitalising a mare with a foal at foot presents a wide range of challenges to the veterinary team due to patients differing care needs. The care needs of the foal will vary depending on the developmental stage.

Admission of the patients

Admitting a mare for treatment at an equine hospital when she has a foal at foot is not comparable to admitting an adult horse with a companion. The foal, even though it is not the primary patient, has very specific and complex care needs.

The specific care needs of the foal include:

- Allowing time for the development of the selective maternal bond
- Facilitating appropriate behavioural development

- Handling requirements
- Nutritional needs appropriate for the developmental stage
- Accommodation with a movable partition barrier
- Hygiene precautions to prevent nosocomial infections
- The role of the owner in the provision of care during hospitalisation period

The owner is normally the primary source of information when the patients are admitted for hospitalisation. It is essential that a full clinical history is obtained. This should include details of the mare's previous pregnancies and any associated complications, recent notable changes in the mare's behaviour and if the mare has run any milk prior to foaling (Austin, 2013). The client should also be asked about the behaviour of the foal, if it was born to term, if it has passed the meconium, urinated and nursed from the mare (Ballentyne, 2014).

Informed consent must be gained from the owner of the mare and foal before commencing treatment (Macdonald and Gray, 2014). Treatment costs for mares and foals can rapidly escalate. With this in mind, the client should be provided with an accurate estimate and should be kept informed of any changes to the estimated costs.

Handing the foal

Examination and treatment of the mare during the post-partum period may result in bonding problems between the mare and the foal and increases the chance of the mare rejecting the foal. To minimise this risk of this occurring veterinary staff should receive training on mare and foal handing and restraint so that clinical procedures can be undertaken quickly and efficiently. A study by Simpson (2002) investigated whether, the intensive handing of young foals causes them to be more accustomed to humans and more receptive to training. The study found that the handing of the foals had a positive impact on their behaviour towards people and the foals demonstrated more calm and friendly traits than the control group of foals that had not been intensively handled. Veterinary Nurses (VN) should see the requirement to handle hospitalised foals as an opportunity to have a positive impact on their behavioural development. To do this VNs should be calm and patient with the foal and give it time to adapt to new environments before commencing clinical procedures.

Multiple team members will be required for the restraint and examination of the mare and the foal. If the mare is used to being handled it should be possible to just have one person to restrain her during the clinical examination. The foal on the other hand may require multiple people for restrain and examination. If the foal is to be examined while standing, one person should place their arm around the mid-section of the foal's neck. The other hand is used to hold the foal's tail with the fingers at the base of the tail and the thumb uppermost (Corley, 2008b, p.129).

Hygiene requirements of the foal during the neonatal period

Due to the immature immune system of the equine neonate, it is essential to take rigorous hygiene precautions to prevent the patient from acquiring nosocomial infections. Hospital accommodation should be thoroughly disinfected prior to use and a strict barrier nursing protocol including the use of a foot dip should be put in place. The patients should also be allocated their own set of equipment to minimise the risk of pathogen transmission via fomites (Mallicote, House and Sanchez 2012).

All personnel that enter the accommodation should wear person protective equipment including gloves and an apron. This will prevent transmission of pathogens to the patient via contaminated clothing (Shea and Shaw, 2012). Hands should be methodically cleaned using an alcohol hand rub before and after handling the patient using a recognised technique such as the World Health Organisation (WHO) method. This will ensure that all surfaces of the hands are adequately coated in the alcohol hand rub (Vincent, 2012).

The umbilicus is a potential route by which pathogens can enter the foal's systemic circulation. As a result of this umbilical care is essential. Knottenbelt, Holdstock and Madigan (2004) recommend applying an antiseptic solution containing chlorohexidine gluconate and isopropyl alcohol to the umbilicus every 6-8 hours for the first 24 hours post-partum.

Separation from mare during surgery

During the post-partum period, the mare and the foal display a range of behaviours to establish a selective maternal bond. The bonding behaviours that are normally exhibited by mares and foals include nose to nose touching and the mare nuzzling the foal's perineum. These behaviours are displayed most intensely during the first three days post-partum (Elkanah, Gorgan and McDonnell, 2005).

If the mare requires surgery it will be necessary to separate the foal from the mare. This is will be a stressful time for both patients and may result in bonding problems between the mare and the foal . Possibly leading to the mare rejecting the foal. Allowing the mare and foal to spend some time together before taking the mare to surgery to allow time for the selective bond between the mare and the foal to be established would be advantageous. However, this is not appropriate if it will be detrimental to the mare's health. Plate 1 shows a relaxed foal following a well-managed separation from the mare.

Allowing the foal to nurse from the mare prior to separation will help with the bonding process and will give the foal the opportunity to consume the mare's colostrum. It is essential for the foal to consume colostrum within the first 24 hours post-partum to ensure that passive transfer occurs (Giguere and Polkes, 2005). The normal position that a foal will adopt to nurse from the mare can be seen in plate 2. If it is considered to be detrimental to the mare or if it is not possible for the foal to suckle then colostrum should be harvested and fed to the foal via a nasogastric tube (Nath *et al*., 2010). The colostrum should still be harvested even if it is not required by the mare's own foal as it can be frozen and utilised at a later date. Harvested colostrum should be frozen in a plastic bottle and stored at -20^{o}C, when it is required it can then be thawed in a water bath at 38^{o}C and stomach tubed to a foal (Nath *et al*., 2010).

Post-surgery it may still be necessary to separate the mare and the foal. To facilitate this the patients should be placed in hospital accommodation that has a movable partition barrier (Greet, 2008, p. 150). The barrier should be low enough that the mare and the foal are able to touch so that the maternal bond can be established and maintained. If either the mare or the foal require intravenous fluid therapy it is advisable that they are separated to avoid damage to the giving set (Corley, 2008a, p.37). VNs should appreciate the need for social interaction between a separated mare and foal and should consider this when planning nursing care. Simple measures can be put in place to address this

issue. Such as, allowing the mare to sniff and touch the foal every time they enter the accommodation to carry out a nursing intervention.

Plate 1: Relaxed foal following a well-managed separation from the mare.

Plate 2: Foal nursing from mare in a hospital environment.

Assisted feeding of the foal

Mare's milk is unique in comparison to the milk produced by other species and is the first choice nutritional source for foals. If the volume or quality of the mare's milk is not sufficient to meet the nutritional needs of the foal, it may be necessary to provide supplementary nutrition (Stoneham, Morresey and Ousey, 2017). For this purpose a mare's milk replacer should be used rather than milk from another species as they are specifically designed to meet the nutritional needs of the foal. The unique properties of mare's milk can be appreciated when it is compared to the milk of a cow (see figure1). The high sugar content in the mare's milk means that the main energy source utilised by the foal is carbohydrate (Stoneham, Morresey and Ousey, 2017).

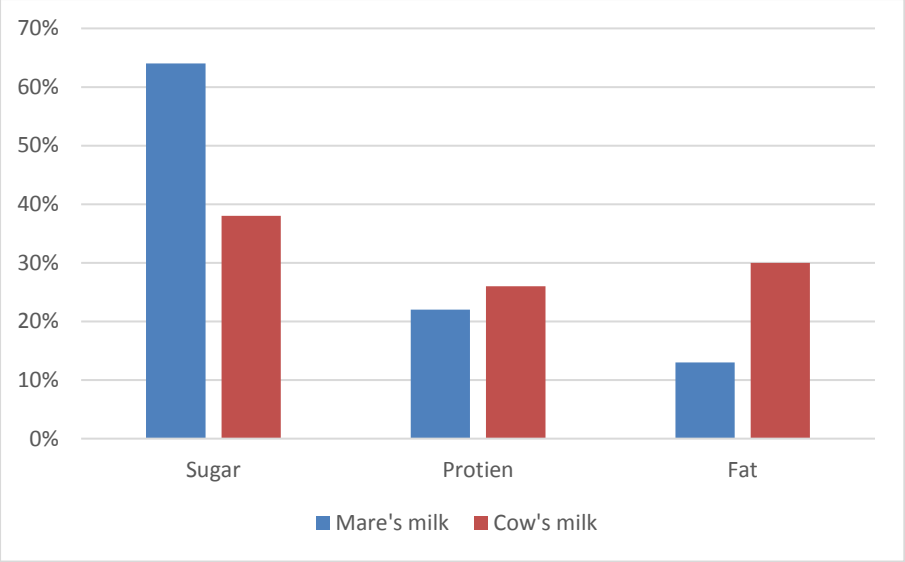

Figure 1: Comparison of the average percentage of sugar, protein and fat in mare's milk and cow's milk (McKenzie and Geor, 2009)

Assisted feeding in equine neonates is extremely labour intensive as neonatal foals have limited glycogen stores meaning that their ability to maintain homeostasis will be effected if they are not fed frequently. Also, the foal's ability to thermoregulate relies on muscular activity and due to their low levels of body fat; this is dependent on the continuous ingestion of milk (Stoneham, 2012, p. 287).

If additional nutrition is required it will be necessary to choose a method of assisted feeding that is appropriate for the foal's age and condition (Stoneham, 2012, p. 294/297). The process that should be followed when choosing a feeding option is illustrated in figure 2. The first factor to consider is the condition of the mare. If she is healthy and producing adequate milk then the best option for the foal is to be left with her. If this is not possible, other options need to be considered. The next option should always be the use of a foster mare. A foster mare will provide the foal with social interaction as well as nutrition. This will have a positive impact on the foal's behavioural development. The foal's suckle reflex is the next factor to be taken into consideration and a foal that has an absent or weak suckle reflex must be feed via a nasogastric feeding tube to eliminate the risk of milk aspiration. Nasogastric feeding tubes require a high level of expertise to place and maintain so their

use is generally restricted to a hospital environment. Other feeding options, such as bucket feeding and bottle feeding, require the foal to have an adequate suckle reflex. Stratton-Phelps (2008, p, 301) suggests bucket feeding as the method of choice of orphan foals as it more time efficient than the other methods and produces less behavioural problems. Bottle feeding is a very labour intensive method of assisted feeding. It can also cause the foal to associate humans with food and can lead to the development of behavioural problems (Stoneham, 2012, p. 289; Stratton-Phelps, 2008, p. 301).

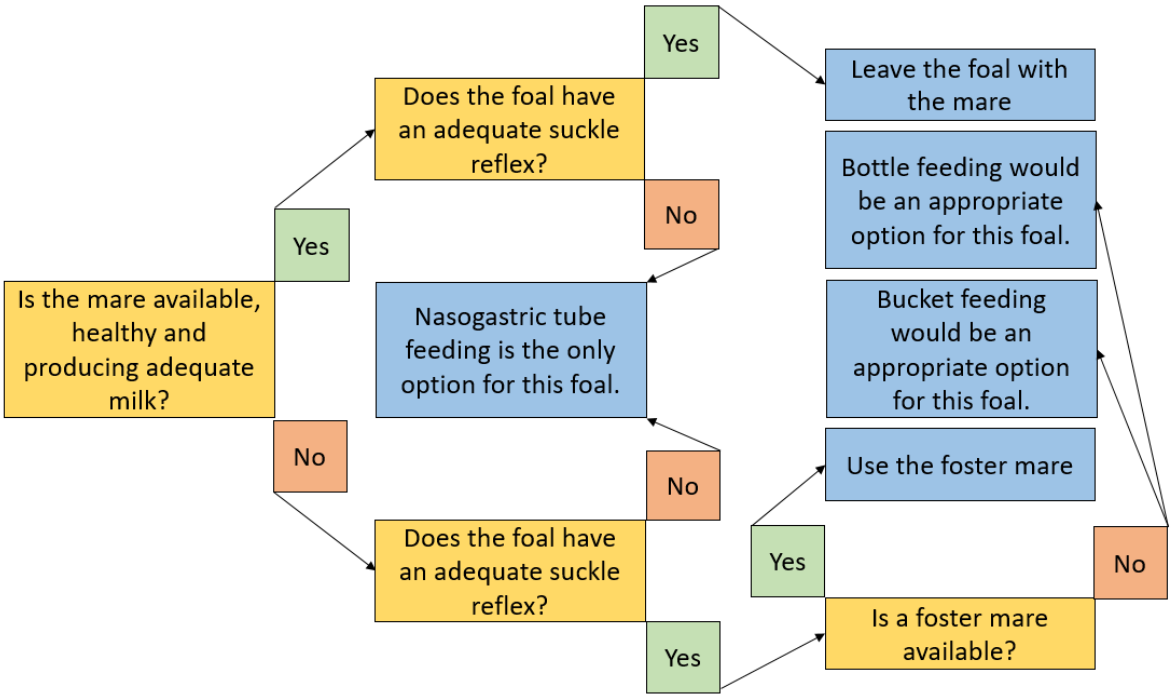

Figure 2: Feeding options for equine neonates (Stoneham, 2012; Corley, 2008b; Stratton-Phelps, 2008).

Encouraging owner participation in care

The success of any case will depend on the care that the patient receives during the convalescent period. It can be very frustrating for veterinary professionals to see patient deteriorate post discharge due to inadequate home care. Encouraging owner participation in patient care during the hospitalisation period helps to avoid this situation. This approach gives the owner the opportunity to master specific skills in a supportive environment and to have a better understanding of the care requirements of their mare and foal prior to discharge. An image of a relaxed foal following a successful discharge can be seen in plate 3.

Cushing Just (2005) discusses a human paediatric nursing concept known as ‘parent participation in care’. The idea behind this concept is that the parent is constant in the child’s life and is ultimately responsible for the care of their child. This is also true of equine patients and their owner, as the care of a horse is the ultimately the responsibility of the owner. In human medicine, a number of benefits of this type of care have been seen. These include, the parent feeling more involved in the

care of their child, improved communication between the hospital staff and the child's family and a decrease in length of the hospitalisation period.

If this concept was applied to veterinary practice tasks such as feeding, cleaning accommodation and monitoring general behaviour of the mare and the foal could be assigned to the owner. The VN would need to provide direction to the owner and keep an open dialogue to ensure that adequate and appropriate care is provided. Tasks such as administering medication and monitoring the patient's temperature, pulse and respiration rates would need to remain the responsibility of the VN it may be possible to involve the owner by asking them to restrain the foal for the procedures.

Due to the owner's personal commitments, it may not be practical for them to spend prolonged periods of time at the practice. To allow for owner participation in care the foal's care plan could be designed around the availability of the owner. This approach would only be appropriate if it is not detrimental to the health of the foal.

In human paediatric nursing this approach has been seen to improve relationships between nursing staff and the parents (Cushing Just, 2005). In equine neonatal nursing, this approach has the potential to have a positive impact on the relationship between the owner and the VNs if the process is implemented appropriately. However, there would be the potential for some resentment to develop if the owner questioned why they were paying for their foal to be hospitalised when they were providing the care themselves. The VNs would need to carefully manage the situation to ensure that the owner appreciated the benefits of participating in the care of their foal and how it will help them to manage the foal's transition from hospital care to home care.

Plate 3: Content mare and foal in their home environment.

Minimising the impact that hospitalisation has on the foal

The lack of equine company that a foal may experience during the hospitalisation period could impair the development of normal equine behavioural traits. It will also put the foal at a high risk of becoming humanised due to the increased level of human contact (Stoneham, 2012, p. 289). To avoid humanisation VNs should, where possible, facilitate physical interaction between the mare and the foal and select a method of assisted feeding that does not encourage the foal to associate people with food. If foals are managed appropriately during the hospitalisation period, they can be supported to develop positive behaviour traits towards people.

Conclusion

Equine hospitals should have a clear protocol for the nursing of hospitalised foals when the mare is the primary patient. The protocol should take into account the social and behavioural needs of the foal in addition to the physical requirements. The handing of the foal should be carefully planned to ensure that the foal has a positive experience. This will help the foal to develop positive behaviour traits towards humans in the future.

The owner of the foal should be encouraged to participate in the delivery of care during the hospitalisation period. This will help the owner to feel more involved during the hospitalisation period and ensure that they are well prepared to provide high quality care post discharge.

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